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ABSTRACT

The current and future role of educational technology in adult English-as-a-Second-Language (ESL) instruction in the United States is examined, drawing on practice, literature, and the experiences of an Arlington, Virginia program. Throughout, policy implications are drawn from the discussion. First, the ESL service delivery system is examined and the diversity of the population being served is discussed. Perspectives on the benefits and the challenges of using technology in ESL instruction are reviewed. The variety of technologies available is outlined briefly, including computers and computer software, video, interactive videodiscs, and integrated learning systems. Both the extent and the nature of current technology usage are examined, and promising models for future applications are described. It is concluded that despite a lack of empirical data on the effectiveness of technology for ESL instruction, continued investment in the technology is warranted, and federal and state governments and foundations should take a leadership role in promoting use of technology. Contains 31 references. (MSE) (Adjunct ERIC CLearinghouse on Literacy Education)

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The Use of Technology in Adult ESL Programs: Current Practice - Future Promise

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A Report Submitted to the Southport Institute for Policy Analysis

By

Inaam Mansoor
October, 1993

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Acknowledgements

This paper is written from the perspective of the "real world of ESL programming"; a world full of the hopes and dreams of creative individuals who want to apply their skills and talents to the science of teaching language and literacy to new Americans. It is also a world full of the realities of low budget/no-budget programming, of a constituency that has no voice, and of a cause that has no political leaders. It is a world that is continually created and recreated as funding levels shift and as new populations are identified. It is a world that stands to benefit from the use of technology as a vital instrument in its work, but it is a world that may never realize that potential because the pressures for basic services are too great, the costs are too high, and the leadership has yet to be developed.

Background information for this paper was derived from a review of the literature, discussions with practitioners, researchers and the technology industry.

I'd like to especially thank my staff at the REEP Program for sharing their knowledge and expertise with me concerning this paper. It is through the lens of their experience that I hope this paper can inspire others to support the use of technology in the field of adult ESL.

OVERVIEW

No longer is it enough just to read and write. In a world where information comes in many forms - text, audio, graphic, video - and where the amount of information is increasing at exponentially staggering rates, the literacy skills of the last 20 centuries will not take our students into the next one. (Electronic Learning Magazine, September 1992)

Clearly, we are in the midst of a technological revolution that is unfolding daily with amazing challenges and opportunities. It is no wonder that there are plans to harness this revolution by creating a National Information Infrastructure (NII) - a seamless web of communication networks, databases and consumer electronics that will put tremendous amounts of information at a user's fingertips. This NII will "change forever the way people live, work, and interact with each other. .... The NII's goals are to enable all Americans to access information and communicate with each other using voice, data, image or video at anytime." [1] The NII envisions technology linked systems for information retrieval, education, entertainment, health and government services.

Where will these changes leave the millions of people who, according to the latest U.S. Census, report speaking a language other than English in this country? How will cities such as Miami, where three quarters of the residents speak a language other than English in the home, cope with the over 40% of residents who report not speaking English very well? What will cities like New York, Los Angeles, and Chicago do for the millions of foreign born people in our new information and technology age?

Statisticians tell us that there are more foreign born people in this country than at any other time in our history. In fact, one in thirteen people in the U.S. is foreign born. (Lapham, 1990). Clearly, the

[1] NIA.(1993), The National Information Infrastructure: Agenda for Action, Washington, D.C.

foreign born population is a valuable human resource that this country cannot afford to squander. Indeed, it is estimated that by the year 2000, immigrants will comprise 29% of the American workforce, doubling their current share (U.S.DOE, 1991). Yet the numbers of job seekers who report speaking English not well or not at all is staggering. They are among the ranks of some 40 million Americans whom The National Adult Literacy Survey (NALS, 1993) estimates to be functioning in the lowest literacy level as defined by the NALS study. This lack of English and basic skills will greatly hamper their ability to become fully functioning members of our society. If limited English speaking adults are to be required to navigate our 'national information highways" in order to access basic services, and if they are to be able to function in high-tech workplaces, then they will need new higher order English communication and literacy skills.

It is therefore imperative that educators recognize the social and political implications of preparing their populations for the fast-moving changes ahead. They must now take into account not just the language and literacy skills that have been traditionally taught, but those that will enable learners to use technology as another medium of communication, just as they teach reading, writing, listening, and speaking. The "survival ESL curriculum" of the 21st century must provide access to technology both as a tool for instruction and as a new medium for communication.

Can programs that are hard strapped to meet the burgeoning demands for basic English as a Second Language (ESL) and literacy instruction keep pace with the need to also prepare the immigrant population for the technological demands of a new information driven society? **They must - and several hard decisions will have to be made.** These decisions will be concerned with access, allocation of resources, and program and professional development. But is the field ready? Is there enough information and are there enough resources and support available to enable programs to make these decisions and to

move in new directions with educational technology?

This paper explores these questions of readiness and presents a discussion of the use of technology within the context of the ESL service delivery system and the unique and multi-dimensional needs of the ESL learner. For this paper, the term technology is used in its broadest sense, including both high-end technologies such as computers, interactive video, CD ROM, etc., and low-end technologies such as language masters, tape recorders and VCR's. Benefits and challenges of technology use are presented along with information about commonly available technologies, the extent of the use of technology, the nature of that use and promising program models. Each section, where applicable, contains policy implications. Finally, some recommendations will be offered to help move the field forward towards removing the barriers that have limited more widespread use of technology for instructional purposes. Wherever relevant throughout this paper, the experience of a technology experienced program in Arlington, Virginia - The Arlington Education and Employment Program (REEP) will be presented through the voices of REEP staff who have addressed some of the challenges presented in this paper. The REEP Program has recognized the importance of technology in the lives of its learners and has made technology use a focus in its programming for adult ESL students since 1987. While the project does not purport to represent the field in its recommendations, it does provide practitioner level perspectives to decision makers based on what we know about technology use from the research base, what we've experienced and what the field must accomplish.

Schools are one of the few institutions of society largely untouched even by the Industrial Revolution let alone the Information Age.

America 2000: An Education Strategy (U.S. Department of Education, Washington, D.C. 1991)

THE ESL SERVICE DELIVERY SYSTEM

Adult Education has traditionally been the step-child of the education system in the United States and ESL the illegitimate sibling. Subsequently, until very recently, resources have been extremely limited for adult literacy and ESL. Even as the funds have increased as a result of government and private initiative, they have not kept pace with the needs.

As a result of the extremely high demand for services, the ESL service delivery system has become a patchwork of programs which differ in size, setting, program goals, contexts, approaches and staffing. The system consists of community based education organizations, local education agencies, voluntary literacy providers, community colleges, workplace education programs and private non-profit schools. Program focus may also vary, including: literacy instruction, survival ESL, pre-vocational or pre-academic ESL, adult basic education, and GED preparation. In addition, there are programs which are designed for a specific functional context such as workplace or family literacy needs. Staffing and professionalization range from loosely organized projects staffed by volunteers with little or no structure or accountability to highly structured, professionally staffed institutions.

While staffing and structure vary across programs, the one common thread is the ever-increasing demand for services. It is the pressure of this demand that has most severely stunted the growth of the use of technology in adult ESL programs. Since resources always fall short of the demand, programs often

respond to the pressures of long waiting lists by implementing open entry, open exit procedures and making cost sacrifices which often negatively impact on program quality. Purchases of equipment and allocation of resources for developing technology use are often not even options. Other common problems which plague ESL programs are the need to account to multiple funding sources and to acquire and manage short term grants and contracts. These conditions inhibit long term planning and result in gaps in services. Additionally, high turnover among staff due to very poor employment conditions have made staffing and professional development concerns serious issues in the field of adult literacy and ESL. Teachers also report feeling isolated, actually encapsulated in their own little world of the classroom and have a need for networking to share ideas with other professionals. (Fingerett & Cockley 1992).

THE ADULT ESL LEARNER

As varied as the service delivery system is, so too are the profiles of the adult ESL learners. The adult ESL learner may have limited education from his own country and low literacy skills in his own language or he/she may have a high school diploma or university degree. He/she may require development of all of the language skills, or he may have target skills that need to be developed. He/she may be literate in a non-Roman script and require skills in developing reading and writing in English. He/she may have, and usually does have any combination of these needs along with others. In fact, many programs have a wide range of learners and have become overextended in their efforts to be all things to all people.

In addition to the variety in learner backgrounds there are also social and economic demands on the ESL learner's time and circumstances. Many immigrants hold one and two jobs in order to make ends meet, and many lack the skills needed to be promoted to better or higher paying jobs. Moreover, many lack the skills needed to meet the day to day demands of living and working in a modern, highly technological world complicated by information needs at home, at school, in the workplace, and in the

community.

As adult learners, however, ESL learners share common characteristics. They bring a wealth of knowledge and world of experience which must be tapped and built upon. They bring learning strategies and survival strategies which need to be capitalized upon in new learning environments. They have critical thinking and problem solving skills that need to be discovered and understood in this society. These skills and strategies especially need to be understood by program planners, teachers, and materials writers so that the learners will be involved in activities that facilitate oral and written communication as well as communicating with technology.

The adult ESL learner can only successfully participate in programs and activities which have adult dignity and which are relevant to their language and literacy learning needs. These needs are multi-dimensional and include: 1)individual and interpersonal dimensions, 2) social and cultural dimensions, 3) political and economic dimensions, 4) affective and expressive dimensions, 5) linguistic and metalinguistic dimensions 6) cognitive and metacognitive dimensions, and 7) perceptual and mechanical dimensions (Wrigley & Guth, 1992). Many of these needs can be met with well designed applications of technology to ESL instruction. While computers may not be the answer for all of these needs, effective applications of technologies that we encounter in our daily lives such as tape recorders, VCR's, telephone message machines, voice mail and bar code readers can be used creatively to increase learner participation, make interactions more authentic and meaningful, and provide a level of familiarity with technology that will help learners become more comfortable with it in their lives and learning.

Policy Implications

Given the typical service delivery conditions described above and the unique and multi-dimensional needs of the adult ESL learner, it is clear to see how difficult it will be for the field of adult ESL to take the necessary steps to prepare

adult ESL learners for the demands of a high-tech society.

However, if the field is to move beyond the "do good" - "feel good" philosophy of service provision to a philosophy that truly understands the ESL population as valuable human capital, intellectual capital and cultural capital, then it must be ready to make the investments necessary to raise the field to a level that will not short-change adult ESL students and leave them on the fringes of a high-tech society in which they cannot fully participate.

Individual programs must also be willing to look at the problems that they face and examine how those problems can be turned into opportunities for using technology. They must be open to looking into the use of technology, recognizing that there will be some initial cost sacrifices to be made as resources will have to be reallocated. Furthermore, they must be willing to learn new paradigms for service delivery. For example, they may have to serve "fewer people - better". And finally, they must be willing to experiment and to share what they learn with the rest of the field.

Yet, programs can't do this until they have "permission". That permission can come in the form of state and federal mandates and incentive. Funders will need to provide initiatives which promote the use of technology including grants for the exploration of, and experimentation with the use of instructional technology for the adult ESL population. They can also create or amend legislation that could be enacted similar to the Technology-Related Assistance for Individuals with Disabilities Act of 1988 (p.L. 100-470 which could:

* Support grants to states for implementation of statewide, comprehensive and responsive programs for technology related assistance

* Reduce federal barriers to financing of needed technology

* Improve federal capacity to provide technical assistance and other capacity building support to states (Hayward, et al, 1992)

The REEP Program Perspective

The REEP Program is a special program within the Department of Adult Education in the Arlington Public Schools. Its mission is to provide for the education and employment related needs of limited English speaking adults who live and work in Arlington, VA. The program depends wholly on special project funding from local, state and national grants and contracts. Annually, the project serves over 2000 immigrants and refugees from around the world, through a variety of components designed to meet their varying needs and goals. These components include general ESL instruction, workplace literacy instruction and a multi-media learning center.

In 1987, the REEP program recognized the need to provide its teachers and students with access to instructional technologies and included the use of technology as an instructional tool as one of its program goals. Faced with larger numbers of potential enrollees, participants who needed flexible scheduling and a desire to make language learning more interactive, it made sense to look into the use of technologies as potential solutions. Since that time, the project has integrated technology into all of its programs and has also moved well beyond the implementation of instructional technologies. Today, program staff have developed customized software programs, repurposed interactive videodisc and have produced broadcast quality video for workplace literacy. In addition, project staff have vigorously promoted the use of technology for ESL both within the program and throughout the state. Under state 353 funds, the project has developed four teacher training modules through which teachers in Virginia can learn how to use technology as both management tools and instructional tools.

Yet despite these accomplishments, the project continues to depend on soft money, and lacks the "permission" that is necessary for the hard decisions of resource allocations as funding levels decline. It is only a matter of time when the crush for essential services outweighs the desire for forging new ways to teach with technology. Our challenge will be to continue to consider the use of technology an essential service for our population.

BENEFITS OF USING TECHNOLOGY

Is technology the answer?

Does technology hold the answers to some of the many challenges that have been created as a result of marginalization of the ESL field? And if it does, what will need to be done in order for technology to be exploited? Technology clearly has many potential benefits to offer both the learner and the program, there are also many challenges. At the current time there is no information that specifically documents the benefits to be derived or the challenges to be faced by ESL programs who want to move seriously into technology use. There are only assumptions, intuitions and practitioner wisdom along with studies from related fields such as adult literacy, foreign

language education, job training or correctional education. Benefits from these sources indicate that the potential is there for using technology to solve such problems as increasing and expanding access to services, improving learner motivation, and addressing various learning and teaching styles.

While not specific to ESL populations, the data from the comprehensive new study, Adult Literacy and New Technologies: Tools for a Lifetime, by the U.S. Congress, Office of Technology Assessment (OTA, 1993) provides valuable information about the potential benefits of the use of technology for adult literacy providers. The adult ESL population is a sub-population within this report. The OTA Report notes that "technology has the potential to eliminate many of the barriers to participation and can address some of the unique needs of the adult learner, but current uses of technology have only scratched the surface." OTA reports that technology can help:

* **staff to recruit and retain learners** by serving as a magnet that draws students to the program and demonstrates to them and their teachers that they are making progress and meeting their goals

* **improve curriculum** since teachers could individualize materials and relate them to student needs and also share "what works" with other colleagues

* **meet staff development challenges** by training teachers and volunteers via video, distance learning and self-study modules; advance collaboration and networking among colleagues through the use of electronic bulletin boards and teleconferencing

* **enhance assessment and evaluation** by tracking student progress continually, minimizing the need for testing. Technology can also provide diagnostics assistance to the teacher. Portfolio collections on audio and video can be collected and analyzed for evidence of progress .

* **streamline administration and management** by computer based handling of attendance records, scheduling, budgeting, and evaluation activities

* **augment funding and coordination** by serving as a magnet to fundraising and business contributions, enabling programs to pool resources and coordinate services and network and communicate with other providers [2]

Additionally, the OTA report has valuable insights concerning the benefits to be derived by programs that use technology for adult literacy programming. ESL providers can consider the many benefits of technology use that have been identified for the adult learner and consider which are relevant

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[2]. Office of Technology Assessment, 1993, Adult Literacy and New Technologies: Tools for a Lifetime, Washington, D.C.:U.S. Congress, OTA

Advantages of Technology for Adult Learners

Reaching Learner's outside the classroom

- With portable technology, adults can learn almost anywhere, any time, and can use small parcels of time more efficiently.
- Technology can carry instruction to nonschool settings-workplaces, home prisons, or the community.
- Adults can be served who would otherwise be left out because of barriers such as inconvenient class scheduling or lack of childcare or transportation.
- Learning at home can be more convenient and private for those who would feel stigmatized by attending a literacy program.

Using Learning Time Efficiently

- Learners can move at their own pace, have greater control over their own learning, and make better use of their learning time
- Learners can handle some routine tasks more quickly through such processes as computer spell checking
- Many learners advance more quickly with computers or interactive videodiscs than with conventional teaching methods

Sustaining Motivation

- Novelty factor can be a "drawing card"
- Technology can be more engaging, can add interest to repetitive learning tasks
- Importance of computers in society can enhance the status of literacy instruction
- Privacy and confidentiality are added to the learning environment, reducing embarrassment adults often experience
- Technology based learning environments do not resemble those of past school failure
- Intense, nonjudgemental drill and practice is available for those who need it
- Instantaneous feedback and assessment are provided

Individualizing Instruction

- Computers can serve as "personal tutors" - instruction and scheduling can be individualized without one-on-one staffing;suitable for open-entry, open-exit programs
- Materials and presentation formats can be customized to suit different learning styles, interests or workplace needs
- Computers with digitized and synthesized speech can help with pronunciation and vocabulary
- Adults with learning disabilities and certain physical disabilities can be accommodated

Providing Access to Information Tools

- Adults need to learn to use today's electronic tools for accessing information
- Adults believe familiarity with computers will make them more employable

Source: Office of Technology Assessment

for the adult ESL learner.[3]

[3]. Ibid.

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CHALLENGES TO USING TECHNOLOGY

What has limited the widespread use of technology for adult ESL?

Clearly, the benefits are many, so too are the challenges. The major ones of course are time and money which impact on such other issues as the complexity of initial implementation, the need to develop technical expertise, the cost of managing equipment and staff, and the costs and time for assessing learning and evaluating program quality.

The first challenge that programs face is the complexity of initial implementation. Careful attention to implementation issues is critical; otherwise, the endeavor is doomed to failure. Prior to acquiring technology, the program will have to decide many issues, and many others will be ongoing implementation questions as the program evolves. Among the many philosophical, logistical and fiscal questions to be considered are the following:

What does the program believe about teaching and learning. This is very important to consider because using technology effectively will depend on a clear understanding of these insights and how technology will fit into this philosophy as well as how it will be limited by it.

Who will use the technology? If the technology is being acquired with public funds, it will be necessary to determine if the equipment will be limited to only eligible staff and students of that funding source and it will be necessary to consider how the access will be expanded for other students.

When will the technology be available? The program will have to decide what the program implementation model will be. A lab, for example, may be far more costly than integrated classroom use. Scheduling a lab will require a careful analysis of learner availability which may be evenings and weekends; times which are difficult to staff.

How much will it cost to staff it and maintain it? This is an extremely important question because programs often find that they have been able to start up a lab, but then run into trouble finding funds to keep it staffed. This cost consideration is one that has also limited evaluation of technology and has inhibited staff development for more advanced and sophisticated uses of technology such as authoring one's own software.

How will staff be trained to use it initially, and what are the ongoing staff development needs? Staff development is essential for programs that wish to promote the use of technology. Effective staff development must be in the form of "hands on" manipulation of the technology as well as

an understanding of how it can be used to enhance and enrich the learning experience. Because technologies are constantly changing and because staff are continually discovering new ways to use them, staff need time to reflect on the most effective uses, and they need time to experiment and communicate with colleagues.

In addition, programs need guidance in selecting software and hardware, in setting up student management systems, and in reporting and accountability procedures. **All of this requires sustained commitment of resources.**

The next challenge is the cost of initial implementation and the cost of a sustained commitment of resources. Everyone agrees that technology can be expensive and no one wants to make a costly mistake, especially when considering such major purchases as an integrated learning system (ILS), for example. Yet mistakes are inevitable. Many pioneering programs have gone through several stages of development in their use of technology. Those stages are characterized by intensive soul searching, fact finding, implementation, disillusionment, enlightenment, experimentation and evaluation. Many of the decisions that they made early on, they would not make today. But those mistakes may have been necessary in order to better develop and comprehend effective practices. Costs for equipment, however, are not the only ones to be considered. Programs and funders considering technology must understand that the students are not the only learners involved in this enterprise. Staff will need time to learn not only how to use the technology in an educationally sound fashion, but also how to deal with technical hardware and software problems. Staff must also be provided training and ongoing support so that their creativity level stays high.

Another challenge is simply the need to manage and maintain technology. The actual physical inventory of materials needs to be maintained and catalogued so that it can be accessed over and over again by multiple users. Someone must be responsible for understanding not just the educational aspects

of equipment, but also the technical. If the technology or software program can't be found, is missing critical pieces or doesn't work, both students and teachers become disillusioned and frustrated.

Finally, evaluating learning is a challenge, but it could be more readily be accomplished if programs had software that kept information about the learner "on line." Unfortunately, that kind of software is not widely available for adult ESL and given the learner centered approaches of many ESL programs, the creation of comprehensive ESL software with this capability may be more than we can expect. Encouraging experimentation with technology-based alternative assessment, however, is taking place. Data is being collected in technology-based portfolios by programs as they meet "individualized needs" of learners. For example, computer disks containing student writing samples over time, and audio tapes or video tapes containing speaking or pronunciation progress over time are being collected. While, these portfolios provide a wealth of information on the individual learner; the challenge is to collect and aggregate data on "groups of learners" with these practices. Perhaps technology can provide some solutions to this problem. Time and money need to be set aside for further inquiry in this area.

Policy Implications

There are important policy implications inherent in the discussion of benefits and challenges of using technology for both practitioners considering technology investments, and policy makers who want to promote technology use. These implications are related to research agenda, technical assistance and leadership.

First, the marginalization of the needs of the adult ESL population must be eliminated. This could be accomplished by the creation of an Office of Newcomer Affairs at the national level and at the state

level where appropriate. These offices could provide the public policy development that will be required to resolve the conditions that have resulted from marginalization.

Second, ESL needs its own separate research agenda. While ESL is included within the adult literacy initiative, ESL is unique enough and multi-dimensional enough to require a more targeted research focus than what has currently be afforded it. It is true that ESL programs share some of the same problems that literacy programs experience, but they also have problems that are unique. For example, most ESL programs do not have trouble recruiting students, there is usually more demand than there are services to offer. Also, ESL programs face a two dimensional literacy challenge when faced with learners who have low literacy skills in their mother tongue. Consequently, traditional grade level assessment of literacy and basic skills programs designed for English speaking literacy learners are inappropriate. These unique challenges warrant a separate and targeted research agenda if we truly value the adult ESL learner because the field needs to know what works best, for whom and under what conditions.

Third, the most critical need that programs who are considering technology have is the need for technical assistance and information so that they can plan for technology use. Programs that are considering technology use must take into account not only how they will acquire technology, but how they will maintain it and grow with it. Resources must be set aside for both equipment and staff time and an ongoing commitment of these resources needs to be considered before a major move can be made.

Finally, while most of the benefits described for adult literacy are equally applicable to adult ESL programs and learners, statements of potential benefits will not be enough to move the adult ESL field forward. Greater impact could be felt if more leadership were taken up to get ESL on the national, state and local agendas. One of the most significant investments that can be made is the development of a cadre of leaders who can:

* raise awareness of the critical and changing nature of our work among practitioners as well as policy makers

* lead a grass roots level campaign to promote technology use

* lobby and advocate for sufficient funds for equipment, staffing, training, experimentation, research and dissemination on effective practices with technology for ESL.

* provide information to programs on what kinds of technology investments make sense and what are reasonable starting points

* provide technical assistance to programs so that they can develop strategic plans for incorporating and increasing the use of technology

The REEP Program Perspective On Benefits and Challenges to Using Technology

At the REEP Program, we have found that using technology has had many benefits and has also posed many challenges for our program and our learners. These benefits and challenges have been different at each stage of our development in the use of technology. When we first began planning our technology initiative, one of the greatest challenges to our effort was the lack of information available at the time to inform our fact finding and guide our decision making. We needed to know about the benefits and challenges technology posed for adult ESL programs and learners. Staff began to search out information and colleagues that could help us make informed decisions, but found that we had to rely on information from the fields of K-12 education and foreign language instruction to help us determine the relevance the benefits would have to our own programs. At that time, there was even very little information available about the use of technology with the adult literacy population. While our initial search for information was long and hard, the commitment to use technology was strong and we set out to determine which technologies made the most sense for us and what funding sources could be called upon. We then developed a plan for not only using technology, but growing with it and extending it to all of our program operations. This was no easy task due to the lack of centralized information, the incompatibility of computer formats, a fear of failure and anxiety over reallocating precious program funds. Yet, despite these obstacles, staff developed connections with other pioneers in the field, software and hardware producers and depended on their own creativity and initiative to create our multi-media learning center.

While one of the greatest challenges to us was the lack of information to make informed decisions, one of the greatest benefits we've derived as a program was is in our own learning. The program has learned that our constituency will have to face the same challenges and frustrations that we face in our daily lives as we encounter new technology in our homes, government, public agencies and workplaces. We have found that we as professional also need to develop a new "technology literacy" if we are to assist our learners in the new information age. This recognition has had a profound effect on how we plan our programs, develop our staff, assess our learners and allocate our resources. While we still depend on "soft money" through grants and contracts, by recognizing the need to use technology and articulating it into effective program models we have been able to be aggressive and creative in our program development and our use of technology has evolved to reflect this. We have been able to draw students and funding sources, software publishers and the public broadcasting industry into unique partnerships for learning, such as "learning corners" at area businesses where computer assisted basic skills training is supported by teachers trained in assessing individualized needs and customization of learning plans for the workplace; a partnership with a major integrated learning system (ILS) to examine how their materials along with other computer assisted instruction (CAI) can be used effectively in the workplace; and a contract with the public broadcasting industry to license videos which our program produced to teach the communication skills needed for successful interaction in the workplace. Through grants that funded the use of technology, we were able to acquire resources that enabled us to experiment with meeting the demands for instruction in different settings - the workplace and home, and through different media - computers at the worksite and cable tv and home videos. But 12 and 18 month grants are barely enough time to develop these models and materials. Now our challenges are related to acquiring the time and resources needed to thoroughly determine their effectiveness and to develop ways to disseminate information.

As for the learner, our staff would echo many of the benefits that are described by the Office of Technology Assessment in the preceding pages. For ESL learners, technology not only motivates learning, it builds self esteem, can provide immediate feedback, can provide learning beyond drill and practice and it can address various learning styles as well as help build learner strategies. Specifically, our teachers report that technology can be used to promote language skills because learners are given opportunities to gather and organize data and use the information to solve problems, and make oral or written presentations. Technology use also makes writing, revising and editing easier, and it provides the learner with an opportunity to become familiar with technology that they will encounter in their daily lives. While this is a long litany of benefits, we would also caution that where technology may be a benefit for one kind of learner it is a challenge for another. For example, while one benefit of technology for adult learners is privacy through one on one self paced computer assisted instruction, is that really what all language learners need? Perhaps it's appropriate for certain skill areas such as grammar or vocabulary development, but what about the use of the technology to promote social interaction through pair work or group projects? The point of this discussion is that blanket statements about the benefits of technology use can be misleading. Most of the data on effectiveness and benefits to the ESL learner is anecdotal. We need to know which technologies are effective for various kinds of learners and under what kinds of situations. Unfortunately, the technology is not there yet for adult ESL to provide comprehensive and meaningful data on effectiveness. Another challenge we face as practioners is how to integrate our "learner centered approaches to teaching" with the need to not only document results for ourselves and our learner, but to be able to aggregate and report them in a manner that can inform the field.

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TECHNOLOGY FOR ESL PROGRAMS AND PARTICIPANTS

What's available?

The array of technology options for hardware and software is extensive, but it's also misleading. Once again, one of the primary problems that programs face is the of lack of expertise to make informed decisions and lack of time and resources to study options, weigh the pros and cons and make the right decisions. This is a major issue given the way the technology industry is structured: programs that will only run on one kind of computer platform (ie., Apples, Mac or dos based); software programs that were designed for K-12 being marketed or repurposed for adults; and programs which require additional RAM, different speech and sound boards, additional peripherals etc. Financially strapped programs can't afford to make mistakes. Their first purchase usually will be their only purchase for a very long time, and the possibility of making the wrong choices is very high because it is very easy to fall victim to a sales pitch when you don't know the right questions to ask.

Once a program decides to consider technology as a viable option for solving some of its problems, then a multitude of new questions needs to be asked such as, what purpose will technology be used for, what technology will be available, and how will it be supported and maintained. These are critical soul searching and fact finding stages that are required in order to make informed decisions of both a technical and a pedagogical nature. This stage can be overwhelming and it helps if programs can first articulate how using technology fits into their overall mission and philosophy for delivering instruction. Then, they can organize fact finding and decision making into a manageable framework. Programs may want to ease into using technology by focusing their planning in one or more of the following areas: technology for program management; technology for language learning; and technology for distance learning. Each area has a distinct set of questions that needs to be addressed. This step by step approach will help programs move more cautiously into the implementation stage where they will need to make

decisions about allocation of resources and how to meaningfully incorporate technology into the curriculum. Once the equipment has been purchased, time and money are factors in how well it will be used for instruction. Extensive and ongoing staff development will also be needed once the euphoria of startup diminishes and the frustrations of the technical problems begin. At this stage, it is critical that staff are supported with time and technical assistance in order to lessen the frustrations and reduce the disillusionment that can set in when staff realize the limitations of most currently available software. While this disillusionment is healthy, if not given an opportunity to see how even the poorest technology can be turned around to support a language learning goal, then the risk of abandoning technology use all together is quite high. However, providing staff development and pedagogical use of technology in one small area at a time, (i.e., uses of word processing for process writing projects) will provide staff more satisfaction, and they may finally get to the "ah ha" stage of enlightenment where they will be able to see what the potential is, and will be willing to experiment with technology on their own.

The computer

There are many technologies that programs can access and use successfully. Most programs will not have much money so they will be happier with a step by step approach to acquiring technology in which they could focus their energies less on what to buy and more on what they will be able to support in a manner that is consistent with sound language learning practices. Among the most exciting technologies available today, of course is the computer. It has become an essential tool in most people's lives and certainly every program should have one, if for nothing more than its ability to draw you to it to explore its potential. Its ability to store, retrieve and manipulate data makes it one of the most powerful tools for program management and language learning that the field has ever had. Additionally, it is a technology that teachers can quickly become comfortable with as they use it for their own purposes of writing lesson plans, worksheets or reports. When combined with other technologies, such as audio, video,

and CDROM, the computer's ability to manage instruction through a variety of media is greatly exploited. Its data handling abilities also hold promise for program management, learner assessment, and program evaluation. Another extension of the power of computers takes place through networking computers together in the same building to share software and peripherals or networking them across long distances with telecommunications software. New combinations of computers with other peripherals have resulted in both interactive audio and interactive video applications.

While not much information is available on the effectiveness of using Computer Assisted Language Learning (CALL) with the adult ESL population, reviews of studies concerning the effectiveness of computer assisted instruction (CAI), in general do reveal strong and consistent trends in findings (Roblyer, et.al., 1988). Limited as they are, these findings can inform the ESL field as well. Researchers have noted positive impact on learning time (Kulik, Kulik & Schwab, 1986), and student attitudes (Phinney and Mathias, 1990). These studies also provide data on types of CAI used and their effectiveness (Dunkel, 1990) and uses of CAI as a supplement vs replacement to traditional methods (Dunkel, 1991).

Software

Software purchase provide a challenge in and of themselves. While there is a lot of drill and practice software on the market that initially turned both the learner and the teacher off to CALL, new software is being made available that is more consistent with shifts in teaching approaches. These shifts are from **form to function** and from **product to process**, with corresponding shifts in the perceptions of the students from their being **learners** (through teaching) to **acquirers** (through discovery) of the language (Pennington, 1989). If practioners approach software decisions from the perspective of the function of the learning task, they will be far more satisfied with their applications and have a greater chance of applying technology in an educationally sound manner. Such a framework for consideration is presented by Wyatt (1987) and is presented below:

APPROACH	CHARACTERISTIC
INSTRUCTIONAL e.g. tutorial, drill and practice, holistic practice, many "games"	* Students are responders, not initiators, despite high levels of activity *Detailed set of high and low level learning objectives * Predetermined learning paths * The computer instructs the student; students learn from the computer
COLLABORATIVE e.g. modeling, discovery, simulation, adventure reading, annotation, some "games"	* Students are initiators, take more responsibility for their learning * May only be possible to specify learning objectives in high-level terms * No predetermined learning paths * Elements of discovery learning; students learn with the computer
FACILITATIVE e.g. word and idea processing, spell check, on line thesaurus, text analysis	* Students are initiators, entirely responsible for their own learning * Learning objectives are paths not specified or embodied in computer programs * Students use computer as a tool to reduce inauthenic labor

Video

Video is another technology that is commonly available and holds much promise for language learning. It is a technology that is readily available, inexpensive and easy to use. It enhances learning by allowing students to use their own background knowledge, much of which is contained in the setting, action, and interaction. Video also allows discussion and increased understanding of cross cultural differences. Other advantages that educators have claimed are that it is highly motivating because it is a familiar medium, it is animated, and often contains a storyline which draws the viewer into the material. When used and controlled by the learner, it can be self paced and can provide reinforcement for and extensions to other aspects of the students learning.

There has been much recent interest in video technologies as a result. Many educators around the world are beginning to take workshops, and university courses to learn how to unleash the power that video has for promoting language skills. Many innovative and creative uses are being reported including teaching communication skills with authentic video, using video to teach young children, using video to evaluate student performance (Stempleski & Arcaio 1993). Unlike CALL, the literature on using video

is quite extensive, but similar to CALL, there are many untested hypothesis about the use of video which have evolved into " a kind of orthodoxy" that have yet to be scientifically tested. It is widely believed that:

* video is well suited for non-readers and low level readers frequently found in ESL programs

* video can present real language in authentic situations

* video can present an authentic look at culture

* when educators enable students to make their own video, they engage in a form of self-expression that is extremely enriching as they learn new ways to organize and communicate their ideas.

Interactive videodisc technology

Well-designed interactive video lessons combine the value of the audio-visual video medium with the power of the computer to create a powerful interface which is extremely easy to use, and allows individualized and private learning. It also can "transport" the student to other places and situations which he or she may be hesitant to try independently, such as using banks and social services, applying for a job or finding out about new job opportunities and training. Some powerful applications of videodiscs are visual databases consisting of still frames that can be accessed and used with CALL lessons (**English Express** is an example of this), simulations and multi-media libraries. Clearly, these advantages are suitable to address the needs of ESL learners who require individualized, simulation-based activities that can stimulate their communication skills and remove the inhibitions which limit communication for language learners. Related to videodisc technology is the barcode reader. This instrument can serve as a valuable tool for easy access to video materials. The use of barcodes will probably increase because the barcode player is cheaper than a full interactive videodisc system and easy to use.

Interactive videodiscs do have their disadvantages and they are severe. First among them is cost

of hardware and software. A typical IVD station will cost between $4,000 and $8,000. Another disadvantage is that the industry lacks interface standards. Different videodisc players require different interface cables and once you have invested in one platform, you may have trouble purchasing additional materials.

The Integrated Learning System

Integrated Learning Systems (ILS) are a special application of computer networking that typically include instructional software for a range of grade levels, subject areas or student populations and a management system that provides a way of assigning a sequence of computer-based activities to students to keep records of student performance and to generate reports. Some ILS such as Josten's Invest offer customized curriculum compilation. This can be valuable for programs that are concerned with a specific function context such as workplace literacy. Unfortunately, most ILSs are very expensive, and few have been written with the ESL learner in mind. Those that have been written for the adult ESL learner are very mechanical and are first generation attempts at integrating language learning theory with computer technology and have a long way to go before they will be acceptable to the field. Most ILSs focus on adult basic education or GED level instruction. Many programs considering ILS have opted against them because they feel they are inconsistent with their philosophy of instruction. They are "not flexible, not adult-oriented, not creative" (Sivin-Kachala & Bialo, 1992). However, ILS are continually being upgraded and as Sivin-Kachala note, they should be considered "works in progress". We would recommend that programs newly entering the instructional technology arena, start small and investigate ILSs at a later date, when they are clear in their understanding of what they are looking for and are better able to determine if they can get it from any given ILS. (See REEP perspective for our experience)

Clearly, there is a lot to choose from and a lot to consider when using technology. However, much

of the technology that could assist programs and learners today is not new, but it is not being used because of time and cost constraints, and the lack of data on what's effective for various learners under various situations. Once again it is important to reiterate that it takes a great deal of time to learn not only what's available in technology use for instructional purposes, but what are educationally sound uses of it. A considerable investment of time and money will be needed for staff to acquire the skills and knowledge to make informed decisions about such costly purchases as computers, video disc players, CDROM's, camcorders, computer networks, and software.

The following chart provides a glimpse into some additional common technologies and some newly emerging ones. These technologies need to be considered by programs, practioners and researchers to determine not only which ones could be used to improve productivity, instructional quality and advancement of the field, but how.

TECHNOLOGY FOR PROGRAM MANAGEMENT	TECHNOLOGY FOR LANGUAGE LEARNING	TECHNOLOGY FOR DISTANCE LEARNING
Integrated Learning Systems (ILS) are a special application of computer networking that typically include instructional software for a range of grade levels, subject areas or student populations and a management system that provides a way of assigning a sequence of computer-based activities to students to keep records of student performance and to generate reports . **Productivity Software:** • **Word processing** enables students, teachers, program staff to compose, revise and manipulate text. • **Databases** can be used to organize student information regarding demographics, scheduling, progress, etc. Databases can help programs manage information, conduct outreach, report program results, predict trends in use and quality of services, and predict and track changes in student populations. • **Spreadsheets** enable programs to create and manage budgets, track spending from multiple funding sources, project spending, and understand costs per service. • **Desktop Publishing** enable programs to create program flyers and promotional materials as well as student and curricular materials. • **Authoring** programs put control of computer assisted materials design and multi-media applications into the hands of the teacher. Teachers can create simple or complex software programs for their own program context. Authoring programs are available which offer templates which provide the teacher with the basic programming structure into which they can insert their own materials. • **Telecommunications** peripherals and software such as fax machines, modems and requisite communications software which allow programs to communicate more swiftly and efficiently, and therefore, facilitate collaboration among agencies and between education and business.	**Interactive audio** - Computers can be used with an audio source such as a tape recorder or a CD-ROM drive. Through interactive audio lessons it is possible to give the students access to authentic language samples through which they can develop their listening and speaking skills. **Language Masters**- On the very low end of technology, similar customization can take place by using a simple language master machine. Cards containing audio messages such as vocabulary or simple and commonly used phrases can be authored and customized by the teacher for various contexts such as survival ESL, workplace literacy ESL or family literacy. **Interactive video** - Computers can be used to control either a linear video (VHS) player or laser videodisc player in order to provide interactive video lessons. **Camcorders and VCRs** - video technology provides opportunity for low cost authentic interaction with language and culture. Creative teachers can put the student in front of the camera as an actor in a role play, or they can put them behind the camera, planning how to present language through the lens of the camera. **Software:** **Word Processing** - for creating and editing written assignments **Spreadsheets and data bases** - for task based learning activities **Tutorials** - introduce new materials and teach procedures such as how to use a word processor **Drill and practice** - allow self paced mastery of materials such as grammar and vocabulary **Games** - provide competition, team learning, high order thinking **Simulations** - promotes experimentation and critical thinking **Spelling, grammar and style checkers** - can aid learners in editing their own work. **Databases and multi-media encyclopedias** - Learners look up authentic information in these resources **Discovery Software** - software that encourages the learner to take risks and learn through discovery	**Local area networks** - Computers can be linked together in a classroom, lab, or building via cables to form a local area network (LAN). A LAN allows users to share the same software and peripherals, such as printers. This is especially useful in a learning lab setting because it frees the teachers from having to load each computer with the software program. On a LAN the software is shared from a single computer (or file server). In addition, a LAN can usually be configured to allow teachers and students to communicate with each other in "real time" or to conduct collaborative writing activities. **Long distance networks** are computers linked across long distance. With telecommunications software, a computer can communicate with another thousands of miles away via a modem and phone line (Willett, 1992). This is becoming an invaluable tool for educators, researchers, and students as they put out their questions and ideas to the field via electronic bulletin boards or access information systems, such as Prodigy or state occupational information and assistance programs. **Satellite broadcasts** - Satellites now beam programs from around the world. These can be captured using a satellite dish - bringing foreign broadcasting right into the language classroom (Willis, 1992). This technology will also enable ESL lessons designed for TV to be broadcast to public television stations that wish to license them and to institutions that have satellite dish capacity. Satellite technology can also be used to broadcasts programs, create interactive TV, and provide distance learning opportunities for rural or difficult to reach areas and populations. Satellite broadcast capability has been instrumental in bringing the field together to share information through interactive teleconferencing. **E-Mail** is perhaps the most promising medium for enhancing professionalism in the field of adult literacy and adult ESL. One example of E-mail is the listserv. Tillyer (1992) describes a listserv as follows: *A listserv is a program that allows an institution's mainframe to serve as a central "postoffice" or distribution center for messages. Users join a discussion by sending a subscription message through the Internet or Bitnet to listserv. Once a user's name is on the list he or she receives all the mail that is posted to that address by other subscribers. A listserv is unlike a bulletin board in that each message is distributed to each person's mailbox.*

The large and complex technology market, the lack of centralized information, and the need to seriously consider technology for solving some of the challenges that the field faces has very important

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implications for funders, practioners and the technology market.

Policy Implications

Funders and policy makers will need to provide the resources necessary for programs to study the feasibility of using technology so that programs can enter into the venture better informed, better focused, and more able to link technology use to effective adult language learning practices. They may also have to provide incentives for software producers to create materials that are more appropriate to the adult ESL learner. These incentives should encourage the producers to collaborate with practioners in the design of materials that they believe would work for their learners and their teaching environments.

Practioners in the field need to come up with better ways to share the lessons learned from programs that have implemented technology. Electronic bulletin boards and listservs offer a great deal of potential for sharing information, but it is a technology that not many practioners are comfortable with yet. Some hand holding into this technology would be very helpful. Practitioners must also be willing to make their needs known to software producers and they must be willing to field test products and provide honest feedback to the producers. If practitioners don't get involved with software producers we will continue to get products that we are unhappy with. Companies are actively seeking advice and they will listen.

As for the technology industry, it should invest in studying the needs and nature of the ESL market so that more appropriate products can be developed. Finally, the industry needs to develop more compatibility across software and hardware manufacturers as well as set realistic prices that will promote the use of technology, not inhibit it.

The REEP Program Perspective on Getting Started and What We Use

The REEP program eased into using technology, first for administrative purposes and then for instructional purposes. After having used computers for administrative purposes for several years, we recognized its potential applications for instruction. Once committed to giving both our students and teachers access to technologies, we developed a plan for gradual growth and maintenance. Our goal was to provide all of our students and teachers access to educational technology. This would be accomplished by first the creation of a multi-media learning center, then eventual integration of the resources into our various curricula.

Our plan included the following:

- Our general philosophy for using technology
- Our overall plan for integrating technology into the curriculum
- Our commitment to acquire and allocate resources including time, staffing, and technology purchases.
- O[illegible]n for maintaining the effective use of the technology beyond initial implementation

Our initial purpose for using technology was to provide an alternative learning opportunity for students who could not attend regular ESL classes. We focussed specifically on those in the workforce. We also wanted the center to provide enrichment for the students who require specialized assistance. Those students could be reached by extending our hours of operation basically from 9:00 to 9:00, 5 days a week, and a half day on Saturday. In this multi-media center, learners could create their own "drop-in" schedule and get individualized and specialized attention. Our initial plan also included integrating the use of technology into our general ESL program. Today, each morning class enjoys a 1 to 2 week rotation in the center. This has provided both enrichment and encouragement for the students as well as a richer exposure and opportunity to experience and experiment with technology for our teachers.

Our initial modes of instruction were to include:

- Computer assisted instruction
- Interactive audio materials
- Listening modules utilizing both language card readers and cassette recorders
- Self paced reading programs
- Manipulative materials for literacy development

We later were able to add an integrated learning system (ILS), interactive video, CDROM, and a camcorder. We are now in the process of acquiring telecommunications software. While an integrated learning system (ILS) was more than we could initially afford, we were able to acquire one through a special demonstration grant offered by the producer of the ILS. We selected an ILS for what we thought was a philosophy consistent with our instructional methodology - competency-based, self-paced, individualized instruction with an open architecture that allowed additional software programs to be added. While the ILS that we selected was in its infancy stage of development and did not provide for us what we naively thought we could accomplish, we look at the experience positively for the capacity building that it afforded us. By being affiliated with a large company dedicated to the promotion and effective use of ILS, we learned how to set up a multi-media lab, how to assess learner needs, how to assign learners to programs and how to integrate the ILS curriculum with traditional classroom instruction. We learned how to fill in the gaps that technology could not accommodate and we learned how to use technology where traditional instruction had its limitations (individualization, drill and practice, self pacing). We would not have learned any of these lessons from the literature on technology use; for adult ESL, it simply did not exist.

We have since moved on to another more promising ILS, again through an innovative collaboration that we were able to arrange. This collaboration will enable us to determine the effectiveness of using customized CAI on the worksite.

We went through several stages of development to get to where we are today, both in terms of technology that we have acquired and skill in using it and there is so much more to learn. Our stages of development included soul searching about our program philosophy, wild enthusiasm about the potential, frustration & bewilderment with the need to make important decisions in the absence of good sound information, disappointment with inappropriate software and sometimes non-functioning hardware, excited experimentation with how "we could make it work", thoughtful and creative application of technology where we really believe it fits in.

Based on our experience, we would not hesitate to recommend that programs incorporate technology into their programming. If funds are limited, start small, find out what resources you can draw upon through partnerships and collaborations and then plan for the allocation of resources accordingly. One thing that is clear no matter how large or small the initial incursion is - you must invest in staff development and the staff development must be sustained. The learning curve for using technology is quite steep. Without the proper support, encouragement and vision of creative leaders and teachers the whole endeavor can stall or worse yet come to a grinding halt.

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THE EXTENT OF THE USE OF TECHNOLOGY

How widespread is the use of technology among adult ESL programs?

There have been indications that interest in the use of technology by the ESL field is increasing. The TESOL CALL interest group has grown steadily in the past few years. Electronic Mail "Listservs" have large numbers of users, and attendance at technology conferences by ESL practitioners has increased. Promising and innovative uses of technology have been reported at conferences such as TESOL, AAACE, CALICO, and SALT. Some successful program models and uses of technology include:

* technology integrated into ESL curricula and programs
* multi-media learning centers with both low end and high end technologies including: computers, audiocassette and video cassette players, interactive video and interactive audio, language masters, CD-ROM based software.
* video labs where students view videos and complete assignments individually or in pairs and small groups
* computer based, audio or video based portfolio assessment - using the capacity of these technologies to record evidence of student progress over time
* customized interactive audio and interactive video materials
* family literacy programs that use parent child dyads
* workplace literacy applications

However, despite the positive indications of growing interest, the actual extent of the use of technology in adult ESL programs is still quite unclear. In fact, given the present economic climate, it is unlikely that many programs are preparing for major or even minor purchases of technology. Some that have technology programs have reported cutbacks in operations.

Since there is no data in the literature that can provide current information on the extent of the use of technology for adult ESL on a national scale, we must again turn to the field of adult literacy for some partial answers. Education Turnkey Systems, in their OTA commissioned report: *The Educational Software Marketplace and Adult Literacy Niches (1993)*, reviewed Adult ESL program needs as a sub-population within other larger programs such as the Job Training Partnership Act (JTPA) system and the Adult Basic Education System (ABE). Turnkey found extensive growth in the use of technology among JTPA Programs. By 1988, 80% of the service delivery areas for JTPA programs reported use of computer assisted instruction (CAI). Although JTPA programs also serve ESL students preparing for job training, no figures were available on the ESL sub-population. Turnkey reports that federal ABE funds support 3,000 local projects around the country. Turnkey estimates that 15% of the ABE programs use CAI. While nationally, ESL students account for 35% of the population served under federal Adult Basic Education funds there is no way to know what percent of those students are in ABE programs that use CAI and give their ESL students access to it.

THE NATURE OF THE USE OF TECHNOLOGY

How is technology being used?

Insights about the nature of the use of technology must also be derived from another recent OTA commissioned study of adult literacy organizations. This study is concerned with **how** technology is being used in **"technology using"** programs. In *Software for Adult Literacy: Scope, Suitability, Available Sources of Information, and Implications for Federal Policy*, researchers Jay Sivin-Kachala and Ellen Bialo of Interactive Education Systems Design (IESD) surveyed 33 "technology using" adult literacy programs, 25 of which also served ESL students. Among their research questions, they sought to determine the following:

> ***What were the current circumstances of provider organizations regarding educational technology?***

What were their wants and needs with respect to educational technology?

How did the wants and needs of provider organizations compare to the available supply of software?

While Sivin-Kachala & Bialo admit that their sample was small, they do believe that their findings are "highly suggestive of an accurate technology picture" for such organizations throughout the United States. They provide insights into administrative uses of technology, software suitability, and they considered their findings in light of such characteristics as technology rich vs technology poor and technology novice vs experienced. Some of their findings are summarized below:

1) Administrative uses of technology by technology using programs - Although the purpose of the study was not to determine administrative software suitability, a limited amount of information was collected. Their study showed that all 33 organizations reported using technology for administrative purposes. The data collected regarding administrative use indicated use of general purpose productivity software (i.e. databases, spreadsheets, telecommunications) for recordkeeping, scheduling, cost accounting, communicating with outside agencies, and marketing to potential adult literacy students. This is significant because, the researchers found that many programs that begin to use technology for program purposes often become curious about its potential for instruction and begin to experiment.

2) Software suitability - One of the main foci of the Sivin-Kachala & Bialo study was to determine software suitability for the adult literacy field. The researchers estimated that there are at least 2,000 products available; 1451 were identified through various software resource guides including one provided by the TESOL CALL Interest Section. The list included general purpose software such as word processors, career guidance software, computer and keyboarding software, employment and lifeskills software, and problem solving software. Of the types of software reviewed for the ESL population, 58.5% was drill and practice, 24.8% - tutorial, 5.5% - simulation, 12% - problem solving, 10.8% game and 30.7% productivity. The researchers found that 82% of the software was judged suitable by respondents for the ABE population, 34% for the ESL population, and 19% for the GED population. This is significant because it echoes what the ESL field has been saying informally, that the software for the adult ESL population is not appropriate.

3) Differentiation of programs: Technology rich/vs poor; Technology experienced vs novice - To get a better understanding of the circumstances of the organizations, the Sivin-Kachala & Bialo study distinguished between "technology rich and technology poor organizations" (defined as rich if the program had 15 or more computers) and between technology experienced and technology novice (experienced being more than three years of experience). These distinctions proved to have important implications for commitment to the use of technology. The report found that these distinctions are important because:

* ***They predict difference in frequency of use and, therefore in levels of computer expertise over time (for both teachers and students)***

* ***They predict which organizations are likely to take advantage of the latest software and emerging technologies (e.g. interactive videodisc, CD-ROM, multi-media).***

* ***They predict differences in instructional management options.***

Technology rich organizations tended to be more experienced and were more likely to use ESL specific software and seek more. These programs tended to have higher standards of quality and were able to articulate their needs in the new software they were seeking. Technology rich and/or experienced programs were more likely to seek out and use a variety of technology; 59% had programs using speech cards, and 47% had multi-media equipment. Thirty-eight percent of technology experienced programs used telecommunications software. Technically experienced programs that have many computers in a classroom or frequent access to a computer lab were also more creative in their approaches to using technology. They were better able to allow teachers and students to restructure the learning environment. They had a better understanding of hardware and software options and the benefits of using technology for individualized and small group learning. Technology novice programs, on the other hand, tended to have a higher frequency of use of drill and practice and tutorial programs and were far less likely to use simulation, problem solving, game or productivity software. Novice programs also tended to "highly recommend" drill and practice software more than the experienced user - 87% vs. 64.4%.

Sivin-Kachala and Bialo also found that when adult literacy providers referred to educational technology, they also included non-computer based technologies, such as VCR (79% used them), audiocassette recorders (61%), televisions - broadcast cable, or satellite (42%). A few organizations were using camcorders and videodisc.

In perhaps one of the most important ESL research projects ever funded by the U.S. Department of Education, researchers from Aguirre International (Wrigley & Guth, 1992) studied promising practices among ESL literacy providers around the country. Where technology is being used well, the researchers found that the program or the teacher has a distinct purpose in using it. Wrigley and Guth found five distinct ways that providers were linking language and literacy:

1) Giving learners access to technology - While programs were generally unhappy with the quality of software available for the ESL population, they believed that it was important that learners have the opportunity to become comfortable with technology in their learning environments. Such programs often combined technology use with traditional classroom instruction, and often the dissatisfaction with currently available software has lead to more creative uses of it; even to customization of lessons by using authoring programs.

2) Technology to facilitate literacy tasks - A simple word processor can be effectively used to raise learner self esteem about his reading and writing abilities, facilitate the editing and revision of a students writing and enable learner generated materials such as language experience approach stories, biographies etc. Databases have been used to survey learner needs, characteristics and even to generate bilingual and multi-lingual dictionaries. Spreadsheets are being used for such interactive learner tasks as creating a budget for a class activity and discussing options of various budget decisions.

3) Using video to provide a visual context - The power of video for providing both visual and audio context is only now being well exploited. Teachers are bring the language learning process to life as they use new ways to take authentic video to present visual and cultural information and ways to develop listening comprehension skill. Oral communication is also enhanced as teachers stimulate the learners to express higher order thinking skills. When they watch or listen to video, they can predict, describe, analyze, argue, defend, judge, recommend, etc. Teachers are also putting students behind the camera, as they have them plan, write, shoot, and edit their own videos.

4) Using technology to promote collaborations and social interactions - They found that many programs pair learners together or place them in small groups to use technology to complete a task such as plan and shoot their own video. Pairing students at a computer, even with drill and practice software can be effective because learners have to communicate with each other to discuss, argue, and decide on answers or other options that the program may require.

5) Using computers to teach language and literacy - most software on the market today has not been designed with the adult ESL learner in mind. Much of it is software that has been "retooled" from other disciplines such as K-12 and adult literacy. Most of it is based on a drill and practice model and is very skills based, thereby limiting a whole language approach to literacy. However, there is software on the market that can enable teachers to customize it for their own use. Such programs allow teachers to create crossword puzzles, cloze exercises, vocabulary drills, even pronunciation exercises.

While technology use was only a small part of the Aguirre study, it provides valuable data on the nature of the use of technology specifically among ESL programs. It provides real insights into technology use and its relationship to program practices. A more indepth analys' specifically targeting technology use would be a good follow up to the original report.

Policy Implications

The implications of the three studies are quite important. They seem to indicate that we will never know **"what can be"** in technology use if we don't know **"what is"** the state of the art both in extent of the use and the nature of it. We must get some baseline data and information about promising practices.

The Turnkey Education Systems report shows clearly the problems inherent in excluding ESL from its own research rights. Data on the extent of the use of technology among ESL programs is virtually non-existent and will never be derived accurately as long as it is collected as a sub-population of adult literacy.

Sivin-Kachala & Bialo make important observations in their study of the nature of the use of technology that provide insights into the kinds of supports that are required for effective implementation of technology. Their distinctions between technology rich/poor, experienced/novice organizations indicate that resources and access to technology can have positive impact on use. While no data is available on how or what the learners in these various programs accomplished, the evidence is clear that programs that had more technology found ways to use it and extended it to new applications. They were more creative in their integration of technology into the curriculum, they had higher standards of quality, they could articulate their needs better, and they were therefore more open to new software and experimentation with technology. Surely, this does not mean that we should make everyone "technology rich" (although it wouldn't hurt), but it does mean that there needs to be an adequate enough level of resources, both human and technological, to sustain a successful implementation so that programs can become "technology experienced." If programs settle for purchasing a "turnkey system" - one that they can turn on and basically walk away from because of its proclaimed "automation capability", then the programs are probably walking away from unlocking the real potential of technology - human understanding and

manipulation of it to its maximum potential for language learning and program management. Instead, let's put technology into the hands of creative and competent professionals who are willing to experiment, document and share their experience with the field and the technology industry.

Finally, it is evident from Wrigley and Guth's report that meaningful applications of technology have a greater chance of success for both the learner and the practitioner. Wrigley and Guth's work shows that there are successful practices that need to be documented and disseminated to the field. This can be accomplished by funding demonstration grants for model practices and by providing enough time and resources for meaningful evaluation and dissemination activities.

The REEP Perspective on What Works Best for Linking Language Learning and Technologies

Donna Moss
ESL Teacher/curriculum writer

At REEP I have had the opportunity to teach in our Learning Center as well as in the classroom. I have also been involved in developing curricula for both environments. The Learning Center learners work independently, using a variety of technology - computers, interactive video, tapes, and language masters. The software includes drill and practice for vocabulary and grammar, reading programs, word processors and data bases. Learners receive guidance and support from the teacher when they need it. At any given time there may be 20 different learners working at different levels of language proficiency with different goals and needs. Most often these students are working alone. The question that arises, when developing curricula for the Learning Center, is what does each technology best teach? And what is best taught in an independent learning situation?

The overall consensus of the Learning Center staff is that this environment, with the software and technologies available, is most appropriate for teaching reading and writing. Listening skills can also be developed - much of the interactive software has audio components for practicing pronunciation and getting feedback. Learners do improve their reading and writing and listening. I have seen learners make dramatic improvements in these skill areas. There have been times when I have had students in my class with high oral skills and very weak reading and writing skills. This had kept them from progressing to the next level. I referred these students to the Learning Center where they concentrated on reading and writing. A cycle or two later they were ready to return to the classroom, often at the higher level, and they were performing "at level" in all skill areas. They had also become more independent learners and I would often see an increase in self-confidence.

Intermediate and advanced learners have great success in the Learning Center. They can easily articulate their needs and goals to the staff. They work well independently and quickly adapt to learning language with technology. There is also more quality software available for them. In addition, they are able to use software that was originally created for native language speakers because of their level of proficiency with English.

The greatest challenge we have had in the Learning Center, is providing for the very beginning student who has low oral/aural proficiency. Learners at this stage of language development can build their vocabulary with pictures, and language master cards. They can the move to the computer for more practice in reading and writing the new vocabulary, read books, and listen to tapes where the vocabulary is used. However, unless there is a conversation focus group, or there is a reasonable amount of uninterrupted time for the teacher to work with the learners, they do not have the opportunity to practice the vocabulary in conversations.

In working with the Learning Center staff to formulate the best type of curriculum for the beginning to low intermediate student, it was decided the we would focus on developing their reading and writing skills. Topics such as health and consumerism with be taught through reading and writing.

I believe that language learning is wonderfully enhanced by technology, but works best when integrated into a learning environment rich in social interaction - an environment where language can be practiced through speaking and listening as well as reading and writing.

The REEP Program Perspective on Being "Technology-experienced"
Jennifer Slater, Learning Center Teacher

For me, becoming "technology-experienced" has had a profound effect not only on my creating and using technology-based lessons in our learning center, but also on my classroom teaching. As one of the original learning center teachers, I had the advantage of several years of experience working with students on all kinds of technology, including commercial CAI software, and closed captioned television, before embarking on the task of designing CAI lessons myself. I relied heavily on this experience as my partner and I made the thousands of decisions necessary for the process of instructional design: What is it that we are trying to teach? How can we give learners feedback? Which screen prompts are helpful to adult learners and which are confusing? Which basic skills are well taught through CAI, and which better taught through other media? How much context will the learner need in order to do the lesson independently? These and many other questions could only be answered in the light of my experience with the failings and strengths of other technology-based programs. Conversely, my experience in design greatly expanded my understanding of what technology could do and what its limitations were. I began designing CAI lessons with interactive videodisc, digitized audio, scanned images and all manner of graphics at my disposal. This made me think much more creatively about the rich learning environment that technology can provide, and it improved my ability to use other technology-based programs with my students.

In addition, as I became more technology experienced, I grew in my understanding of language learners as independent learners. Although language learning must always be in some measure an interpersonal process, I've come to see great value in fostering independence from a teacher. Also, I've learned a lot about the process of language learning and language teaching by observing students and by reflecting on my interactions with them. As you use technology, your role as teacher changes from the giver of information to a facilitator of learning, and as a collaborator in learning. In these roles, I can step back and observe students as they respond to a technology enhanced learning situation and watch as they begin to make connections about their learning strategies. In effect, I've been able to observe them learning from their own perspectives.

In sum, my acquisition of technology experience has followed a zig-zag path from use to design to the classroom and back again, each experience enhancing the next and being informed by the last. Certainly it has made me a more creative and insightful teacher than I could otherwise.

The Reep Perspective On Using Video
Betty Lynch, ESL teacher

In my experience, using a video camera in the classroom promotes more communication and discussion because "filming" an activity requires direction, coordination, and content discussions. The desire to produce a polished video motivates both students and teacher to prepare and practice more diligently. The topic usually requires library research, write up and editing skills. There is a job for everyone that balances strengths and weaknesses; it allows those who are strong orally to help direct and explain to those whose strength lies in writing and vice versa.

Undoubtedly, the camera creates excitement in the classroom. The students feel there is a specific purpose and the need to do the best they can because they are being recorded. Although there is a certain pride in producing an error free tape, in the heat of the moment, the students tend to loose their inhibitions and are less focused on their mistakes. As Krashen would say, their affective filter is lowered, due to the spontaneity being more important to good film continuity. All in all, the students were proud of their presentations and feel a sense of accomplishment. From a practical standpoint, reviewing the videotapes, gives students a opportunity to take an objective look at their language performance and allowed me to do follow up activities and evaluate the students pronunciation, intonation and grammatical structure.

PROMISING MODELS OF TECHNOLOGY USE

So what works in various learning situations?

The complexity of the language learning process, the discrete skills that need to be developed, and the socio-linguistic and cultural dimensions of language, make it impossible to recommend one instructional use of technology over the other for all programs and all learners. While there are some promising practices in the field, information is not yet available in any form that can be disseminated. There have been some very exciting experiments with the use of technology, but they are usually short lived and run out of resources before they get to the evaluation and dissemination stage. This is usually because the programs underestimate the time involved to set up and implement the project and data collection problems arise. In the absence of current data, programs will therefore have to decide for themselves how technology can be used to address the complex issues of access, motivation, need for additional practice, need to address various learning styles, need to meet employer or funder expectations, and need to use educationally sound materials and practices that are consistent with their teaching and learning philosophies. However, some insights may be drawn from some of the following models that are being used in adult ESL programs and in other fields of education:

1) Classroom based model - Ideally, all programs, would combine traditional ESL teaching methods with technology in the classroom. Many experienced practitioners feel that there are decided advantages to integrating technology into their curriculum. They believe that in this way, technology's role can enhance the instructional process, enrich the learning experience and expand and exploit the learner's cognitive strategies as well as provide the teacher with additional resources for handling such common problems as multi-level classes, open-entry, open-exit situations, and differing learning styles. Guth and Wrigley (1992) also point out that this model holds the greatest promise for supporting the principles of "meaning-based literacy" education. It allows the students to have an active role in decisions about how they want to learn, and it enables the teacher to link classroom based instruction with real world applications of technology. (See REEP perspective for example)

2) Video and video-based models - Video and video-based technologies lend themselves well to the classroom based model. In fact, Stempleski & Arcario (1992) report that the extent of the

use of video for ESL instruction is not known, but they believe that there is a "boom in video use". Teachers can use such technology as:

Closed captioning - This is the process by which audio portions of television programs are transcribed into written text that appears on the television screen concurrently with the TV program. Closed captioning was originally designed for the deaf, however, more educational uses are being tried. Perhaps one of the most promising is its use with ESL learners. Many schools take advantage of the captioning that is available on most recent TV programs, news broadcasts, and films to incorporate video into literacy instruction. In addition, the National Captioning Institute in a recent study of their caption device market found a dramatic increase in the number of limited English speaking (LEPS) adults who have purchased the device to help them understand TV programs better. This is significant information about a language learning strategy that LEPS have chosen for themselves.

Two way video classes - Two classes across the county or state can communicate via two way video. A camera is set up at each location, and teachers and students may interact with one another. Their images are broadcast via cable (relatively cost free in most communities that provide local access programming) or satellite (much more expensive).

One way video-one way audio - In such a set up, the teacher may be on video presenting a lesson, and students may communicate with her through a phone line.

Interactive TV - The new digital technologies are making it possible to use a hand held keypad device to interact with an instructional program.

Multi-media platforms - These platforms link computer with print, video and audio devices and enable the learner to manipulate the instructional program using text input, sound, or touch screen. Some of the most exciting work in elementary and high schools is putting multi-media tools in the hands of the learners to design their own presentations.

Camcorders - Smaller, lighter-weight and relatively inexpensive cameras are now on the market that can be used for a variety of activities that actively engage the learner.

3) The multi-media lab or learning center - Some programs have found that providing a learning center gives them important advantages, particularly if the lab is "multi-media". Multi-media labs offer such technologies as CAI, audiotape and videotape resources, and language masters. On the upper-end of technology, they may also have interactive audio and video resources as well as camcorders, CD-Rom and telecommunications software. Typically, these centers are designed to meet the needs of 1) students who cannot attend regularly scheduled classes because of home or work responsibilities, and 2) learners and teachers to access materials that can address a variety of language skill areas as well as learning modalities. These centers are particularly useful for busy adult ESL students in urban areas and for individual learners whose oral and literacy skills may vary tremendously. A flexibly scheduled multi-media center that students can access on a drop-in basis makes teachers and technologies conveniently available to the learners. Another advantage is that learners have input into the media that they wish to access. Additionally, such centers tend to value individualization and customization of materials, making the learning center a rich learning environment for the teachers as well as the students.

4) Employer sponsored learning corners or learning centers - For some ESL learners who work several part-time jobs, even centrally located learning centers are not the answer. Recognizing this need, many workplace literacy programs or employer sponsored programs have looked toward putting instructional technology in their workplaces. The Nabisco Corporation, Ford Motor and G.M. Corporation to name a few, all have employer sponsored learning centers. The REEP Program, in collaboration with Josten's Learning, has also implemented a "learning corner" at four businesses in Arlington, Virginia to determine the feasibility of CAI access at the worksite. The most obvious advantage of employer sponsored operations is convenience to the job site. Other advantages include customization for work-related needs, and immediate application of learned skills to the job. Another important advantage of these centers is that employers have come to value family literacy, and several have opened the centers to worker's families. Partnerships have also been created by community colleges along with employers to provide learning centers for their employees. One such model is being operated by the El Paso Community College in Texas.

5) Mobile vans and home learning options - Some programs that have to meet the needs of learners in rural areas or the needs of learners who are homebound have found creative solutions by sending computers and technology home with the learner through the use of laptop computers and video lessons. In other cases, programs have converted vans and buses, equipped them with teachers and technology and dispatched them to rural areas or to workplaces in order for the students to access service. The James Madison University's Career Enhancement Program is one such model in Harrisonburg, Virginia. Program staff report that this model has the advantage of serving more than one location per day and providing instruction where it otherwise would not have been available.

Policy Implications

While ESL programs have been very creative in designing models and strategies that address varying needs, many providers feel frustrated that they lack sound evaluation strategies and the resources needed to document the effectiveness of their interventions. There is no documentation for what works best in various situations or whether technology interventions are any more effective than traditional methodologies. This situation is not unique to the adult ESL field as reviews of general CAI effectiveness studies indicate (Hope, Taylor, Pusack, 1984). Experimentation, however must be encouraged as well as documentation of "what works". Funders must also understand the nature of ESL instruction, especially in a learning center environment. There is no one best software program or technology on the market that can meet the needs of all learners. Each day, in learner centered programs, staff create customized curriculum based on learner goals. Programs

that operate in response to these individual goals will need to have the opportunity to design ways to not only capture the rich qualitative data that is collected in individual learner files, but they will need to define ways that the data can be reported and disseminated to the field.

Policy makers must also consider the video and cable industries and the promise that they hold for ESL instruction and service delivery. The Annenberg Washington Program (1992) recently reported three important new trends in video technology: 1) better quality digital images 2) more transmission capacity, and 3) greater interactivity. Each of these has implications for literacy and learning that are already being felt. For example, the advances in digitalization and circuitry have made it possible for laws to be passed that will require every television produced after 1993 to have decoders for closed captioning. As related to more transmission capacity, the country is very close to having video on demand through the pay per view market. Cable TV companies are willing and eager to include educational programming, and the telephone companies are interested in participating in video distribution. In fact, a recent report prepared for the Ford Foundation notes that the U.S. is experiencing a telecommunications revolution that will create unprecedented opportunities for the transmission of literacy programming (Schwarz, 1992). Video compression technology will expand transmission capacity and agencies such as PBS already plan to expand educational programming to 40 educational channels in 1993.

The most important trend reported by Annenberg and the Ford Foundation studies is that there will be "more, higher quality and generally cheaper video technology and transmission capabilities in the future". While this is potentially good news for the ESL field, leadership is going to be needed that will follow this trend and look out for the interests of the adult ESL learner as well as the adult literacy learner.

The REEP Program Perspective On Integrating Technology into the Classroom

Dorothy McDonough
Learning Corners Facilitator, ESL Teacher

At REEP, teachers have an opportunity to use technology in several different ways: in a multi-media learning center, in the classroom and at the workplace with a "CAI learning corner". These various technology models have come as a result of our own learning and experimentation with technology and how we've evolved. I have worked in all three settings and find the opportunity to integrate technology into my classroom and transition students into independent use of technology to be very exciting. As a teacher in the morning class I can use the learning center with my class for approximately one week out of a twelve week cycle. I have become much more curious about various technologies and have learned how to integrate technology-based learning tools such as videodiscs, computers and cam-corders, from the learning center into the classroom and vice-versa. For example, with the curricular unit "Finding a Job" at the B1 level (SPL III), I introduce the students to occupation vocabulary through the use of a videodisc. Students can simultaneously see a realistic and clear illustration of the word, see it in its written form, and hear it by itself and in a conversational context. After reviewing the vocabulary, the students are given a worksheet that contains the words and line of bar code. I then conduct a dictation, and ask the students to listen for the words. If a word is on their paper, they take the barcode reader and scan the code. This activity reinforces the newly learned vocabulary, and gives the students hands on experience using new technology that they see everyday at the supermarket. This activity also helps to ease the transition from the classroom to the learning center for our one week rotation. The next week in the learning center the students use vocabulary and spelling software utilizing the same vocabulary they had learned the previous week. Students also view and discuss video tapes of job interviews during this week. Back in the classroom the next week, the students are armed with appropriate vocabulary and solid examples of what a job interview in this country is like. They are now well prepared to practice job interviews with each other. The students perform the interviews which are then videotaped by other students. Students view the videotaped interviews of their classmates and evaluate the students on their success as an interviewee.

By integrating technology in this way, I was able to introduce the students to technology in a controlled and comfortable environment. They were able to overcome their "technophobia" as a group and with their teacher's assistance. Once in the less controlled learning center environment they accepted technology as a valid learning tool and were able to use it with a minimum of fear. Follow up in the classroom brought the unit to full circle for them. Subsequent use of technology in this classroom was met with great enthusiasm because they could see how it was being used to enhance their learning experience.

The Reep Perspective on the Learning Corners Model

Marcy Mueller
Director, Human Resources, Hyatt Arlington

In our diverse workforce, it is our responsibility as employers to offer programs which foster employee development and assist employees to meet the changing demands of our industry. Hyatt Arlington has been in partnership with REEP to provide on-site ESL classes for over five years. These classes allowed many of our service workers to earn promotions through their improved English skills. These internal promotions add to the quality and morale of our workforce. Convinced of the importance of on-site ESL education, Hyatt recently ventured into a federally funded pilot program using computer aided literacy instruction. We were provided with a compute, software, workbooks and some instructor time. In our "Learning Corner" program, each student chooses a manager to be their mentor. Mentors act as motivator and spend one hour per week at the compute with their student.
Employee interest in this program was overwhelming. Through an application and selection process, 18 students were chosen to study independently 3 hours per week on the computer. The majority of students selected had completed some high school level education in their country, had moderate verbal skills, but lacked reading and writing skills.

At this time, Hyatt Arlington has 12 Learning Corner graduates who have completed 60 hours of self study. Student reaction to using computer aided instruction on-site has been very favorable based on exit interviews. Individualized lesson plans, the ability to work at their own pace and the ability to study when convenient were regarded as positive by the employees. Many employees have second jobs or childcare situations which would have made it impossible to attend a group class. In addition, students state that completing this program has improved their abilities both at work and at home. No formal measurement system is in place to measure the impact on job skills, however, many

intangible outcomes are apparent. The students have gained confidence in communicating with guests and supervisors, they exude a positive attitude, and state they are proud to be part of a company willing to make an investment in its employees. These intangible outcomes are very valuable in our service industry.

In my view, the Learning Corner program is an excellent tool for delivering on-site ESL education. However, I believe that it cannot work alone. Human support in the form of mentors or teachers is vital to the success of this program. Employees commented that mentors were helpful in giving examples and explaining difficult concepts as well as giving support. It is my opinion that a system which integrates traditional classroom training with computer training would be a most beneficial workplace literacy program for our employees.

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The REEP Program Perspective On Effectiveness
Susan Huss-Lederman
Learning Center Coordinator

Use of technology is a means, not an end, to better command of language use and literacy practice. From my perspective as a practitioner and a researcher, I have found that the use of technology is effective because: 1)technology offers special environments for support in language practice and taking risks with language, 2) self-paced computer assisted instruction allows for individualized goal-setting and recording of progress 3) learner control within the learning environment enables the learner to invite the instructor into the learning situation for guidance and coaching. Each of these points is elaborated below.

Support in language practice and taking risks with language. Technology for teaching reading, for example can be very effective for building the confidence that is lacking in adult learner with poor reading skills. Line by line, stories can be recorded on language master card readers. Learners can control how many times they hear stories read to them. Learners who start reading with this self-controlled support and enjoy this approach are able to move to independent reading. In fact, the next step for some is to read aloud to others. They take the risk of reading aloud without the language master support. This is effective. This is progress for that learner.

Similarly, pairing learners who know each other to work on computer programs together enables them to negotiate meaning and collaborate on problem solving. It enables some learners who are reluctant to speak up in teacher-controlled learning situations to take on the participant role of teacher or coach with another learner. When a beginning speaker or low-literate learner can teach another, this is confidence building. This builds communicative competence. This is effective.

Self-paced computer assisted instruction allows for goal-setting and recording of progress. This is especially true of integrated learning systems. Learners generally state literacy related goals in one of two ways--they either state that they want to improve in their ability to read and write (emphasizing basic skills development), or they want to be able to accomplish a lifeskill through improved reading and writing. Mothers and fathers often say that they wish to learn to read and write in order to help their children with homework. Others want to be able to be self-reliant in managing checking accounts and bills.

Once learners have gone through the process of setting their goals, they must work on them. As they work on programs that are appropriate in helping them succeed, their progress can be recorded and referenced to basic skills development. When conferencing with learners about their progress, an instructor can print out an achievement plan and say, "Not only did you reach your personal goal, but you have also improved in this skill area." Qualitative measures of learner satisfaction, such as improved self-esteem and likelihood to take risks can be described within the context of achieving lifeskills goals. Formalized tested measures of progress, as recorded by success on computer lessons, are also important in an overall evaluation of learner progress. Each lens glimpses a measure of progress from a different perspective.

The learner is in control. When learners have more control over their learning environment, the role between teachers and learners shifts. Learners invite the instructor into their environment, explaining a problem and asking for an opinion, requesting assistance, or requesting a conference on their progress. Education becomes a cooperative, dialogic process, centered in the context of learner control. This is effective.

CONCLUSIONS

In the absence of empirical data on the effectiveness of technology in teaching ESL, should federal and state governments, private foundations, employers, individual programs continue to invest in technology use for ESL?

The answer to this question is easy and simple - yes. The reasons are far more complex.

First, technological advances will continue to make sweeping changes to the way we live, work and do business in this country. All Americans will need to be comfortable with technology in their daily lives and workplaces or there will be devastating socio-political effects for the growing numbers of immigrants and refugees in this country who will lack the skills needed to access goods and services and participate as an informed citizenry in a high tech society. This means the ESL population must have access to technology and to learning opportunities that effectively use it.

Second, the need to provide adult ESL instruction has exceeded the capacity of most programs or funding agencies to meet, and the demand will continue to increase as more and more immigrants enter the country and more and more of those who have not had access to instruction begin to act on this critical need. Technology holds the promise of expanding access to instructional services and the promise of enhancing and accelerating learning in various learning situations at school, in homes, and in workplaces. Without expanding ESL instructional services, we will be left with a growing population of limited English speaking adults who will quickly take their place on the fringes of society and remain in linguistically isolated situations. Without accelerating learning, we will never meet the growing needs for services. However, a serious technology initiative must not greatly impact on funds for general services. A technology initiative will require a substantial increase in resources from many sectors of our society. The federal government must take the lead by increasing its commitment in this area. It can accomplish this by amending or creating legislation that will more realistically meet the needs of this population and

by creating incentives for businesses through tax deductions or tax credits to provide assistance to their limited English speaking workforce.

Third, the use of technology cannot be looked at as if it were one question and as if all students had the same needs. Each technology has its advantages and disadvantages, each can be used highly effectively or very poorly if its use is not evaluated against the characteristics of the students, their language learning goals and needs, and the ability of the instructor to use the technology as an instrument for learning not teaching. This will require a substantial and sustained commitment to practitioner training and to partnerships between practitioners, researchers and software developers to conduct applied research.

Finally, the use of such technologies as CALL is relatively recent. Not enough data is available about its power or potential. Most of what is available is anecdotal and intuitive. Yet, the use of CALL has been growing dramatically. This momentum cannot be stalled. Programs and practitioners that have finally become comfortable with this medium need the resources and the opportunity to reflect on their intuitions and design evaluation studies that can inform the field. This will require a substantial commitment to applied research that is specific to the ESL population. If we are to move the field forward, research for the ESL population must be conducted in its own right and not just studied as a subpopulation within a larger study of adult literacy or other related fields. Additionally, research should also be "nontechnocentric". Researchers like Papert (1987) recommend that the field move away from the scientific inquiry model because it is too simplistic and limits us to asking simplistic questions such as: Does CAI or CALL work? Can a set of CAI tutorials teach reading to ESL students better than a teacher? Is CALL good for second language learning? What is needed are studies that "illuminate the mental processes" activated or even cultivated by CALL instruction. They suggest that what we need to be concerned about is not what media as a better teacher, but what might combine with learner traits under

different task conditions and performance demands to produce different kinds of learning. Clearly, an empirical base is needed, but the right questions need to be asked or the potential that technology holds for adult ESL will never be realized because policy makers, program managers, and teachers will not have the data with which to make informed decisions.

Demographers have made it clear that growth in immigration will continue over the next decade. Research on adult literacy has alerted us to the high illiteracy rates among the ESL population, and fast moving changes in our increasing technological society require us to act now and act significantly.

Is the field ready to take up the challenge of preparing our immigrant populations for the demands of a high tech society? **No, it is not.** There is neither the leadership, resources, nor research available to make a significant difference.

RECOMMENDATIONS:

Clearly, there is an abundance of software, hardware and technology that can be adapted or adopted by program administrators and teachers to help them do their jobs more effectively and efficiently. What is needed now is **leadership**, at the national, state and local level. That leadership could develop public policy designed to reduce the marginalization of the adult ESL population by recognizing them for their value as human, intellectual and cultural capital. And what is needed is the **resources** and the **research** to implement that policy and transform the field of adult ESL to one that can truly enable its constituency to participate effectively in a modern society.

LEADERSHIP

* to place the needs of the ESL population on the political agenda of policy makers so that sufficient resources can be secured.

* to promote awareness of the potential that technology has for program management and instructional purposes.

* to develop incentives for businesses to become part of the service delivery network for the ESL population

* to create or amend legislation at the federal and state level in a variety of areas such as education, job training and human services that would target funds for the promotion of the use of technology with the adult ESL population

Certainly, OTA, NCAL, The National Institute for Adult Literacy, state resource centers, and the U.S. Department of Education could play a strong role in placing adult ESL program needs at the forefront of their agenda or at least on an equal par with adult literacy initiatives. The Adult Education Act, The Vocational Education Act, the Jobs Act and the JTPA Act all come due for reauthorization in 1995. This is a perfect opportunity to amend legislation that can transform the field by requiring set asides in these grants for technology initiatives for ESL. There have recently been promising signs of strong leadership at the national level promoting the use of technology for adult literacy and ESL. For example, the Department of Education is considering convening a software developers' conference to learn how technology can be developed to address the illiteracy problem in this country that was recently highlighted by the NALS report. The Department is also looking into interactive teleconferencing in the area of professional development, and finally they are considering how to use satellite and cable programming for delivering ESL services in urban areas.

The same holds true at the state level. State Departments of Education need to recognize that the

high usage rates of adult education services by the adult ESL population signal the critical need that language and literacy development play in an immigrant or refugee's life. With the new State Resource Centers, there is a great opportunity to put ESL on the agenda for research and staff development. These centers could take the lead in training teachers on the use of hardware and software and providing resource people to promote successful implementation and research. The professional ESL field must also take up this charge and provide guidance and technical assistance to their program constituencies. With leadership in the areas of demonstration projects, research, information and dissemination, ESL programs would be better prepared to make informed decisions and weigh them against their own intuitions and experience.

Resources

Resources must also be provided to the extent that they can support serious technology initiatives that will:

* not impact negatively on basic ESL services, which are already underfunded

* create set asides for the promotion of the use of technology with the adult ESL population in various federal legislation such as The Adult Ed Act, The Jobs Program, The Vocational Educational Act and JTPA.

* fund model ESL centers that use technology and are willing to engage in applied research

* enable access to technology by adult ESL programs and promote widespread implementation

* promote development, implementation and maintenance of the effective use of technology for administrative and instructional purposes on an ongoing basis. This would include operating costs, staff training costs, equipment repair and replacement costs, upgrades and new purchases.

* sustain ongoing training and support to the field so that the technology can be used to its greatest potential and so that new uses of technology can be discovered.

* encourage the development of ongoing opportunities for dissemination of information via E-mail, teleconferencing, distance learning, etc. that will enable practitioners to use technology for their own learning, and thereby become comfortable with using it with their students.

* promote the creation of new and more effective software applications for ESL learners.

* provide incentives for the technology industry to target the adult ESL market for development of software and technology that is more consistent with current language learning theory and practices

The federal government must take the lead in providing adequate resources for funding programs for immigrants and refugees since it is federal policy that regulates the admission of immigrants and the resettlement of refugees. Basic grants to states to provide adult education need to be at least doubled if not tripled to meet the burgeoning demands for services. A specific line item should be set aside to serve the ESL population and technology initiative must be encouraged. Yes, these are difficult economic times, but resources can be made available when the needs are articulated well and the agenda becomes a priority. For example, $300 million dollars is going to go into the Federal School to Work Transition initiative.

The federal government is in a position to influence both the private foundation sector and the business sector in supporting initiatives which will promote the widespread use of technology. Some possible direct support for these initiatives could be tax incentives for businesses to support their employees in learning English and tax incentives or grants to the technology industry to seriously consider the adult ESL market's needs. The field must also act to provide guidance to policy makers on the need for ESL services and the contribution that technology can make to meeting the need.

And finally what is needed is research that will provide an empirical base for practitioner assumptions, strategies and various applications. The current lack of data is a very sorry state and will hold back any initiative for promoting the use of technology. Policy makers, funders and practitioners will need information that can guide and inform their decision making needs. Information is needed to inform the field on what technologies are available, how to acquire them, use them and sustain successful implementation. Research is needed to assist the technology industry in understanding the complexity of

the adult ESL service delivery system and the spectrum of needs of the ESL learners. Research is needed to determine not only what works and how it works but especially why it works and what affect it has on the learning process. The right questions will need to be asked or the promise of technology will never be realized for the adult ESL field. Among the many issues to consider are:

RESEARCH

* Research to determine "what is" the state of the art in technology use today in order for us to determine what the extent of the needs are

* Research on the critical variables that make technology use effective

* Research that will inform the field on what are educationally sound uses of technology

* Research that builds on the knowledge base, but with specific relevance to adult ESL

One very concrete way to address this need for this research would be to fund model learning centers or schools that would be willing to use technology and participate in applied research studies. Such schools could be funded through private sector and public sector partnerships, and they would provide data that would both inform the field as well as the technology industry.

Effective use of technology relies on critical evaluation of it as a tool for learning in any given learning context. Technology, whether it is high end or low end, will be more effectively used if both the teacher and the learner understand what it can accomplish and why it is being used. Technology holds the promise of enhancing and accelerating learning, expanding access and transforming both learners and educators. Our leadership agenda, our research practices and our resources must reflect our understanding of this promise.

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